Remarks

The Official Action objected to the title, rejected claims 1, 10, and 24 on the grounds of double patenting, and rejected claims 1, 2, 5, 6, 10, 11, 24, 25, and 31-46. Claims 1, 2, 5, 6, 10, 11, 24, 25, and 31-46 are now pending in the present application. Applicant respectfully requests allowance of the pending claims in the light of the following points.

Specification

The Official Action objected to the title of the invention. Applicant, however, has elected not to change the title at this time since Applicant believes the present title accurately describes the disclosure of present application. Applicant respectfully reminds the Examiner that the Applicant has considerable discretion in drafting a patent application and that this discretion extends to the title of the application.

Claim Rejections – Double Patenting

The Official Action rejected claims 1, 10, and 24 under the judicially created doctrine of obviousness-type double patenting. Applicant has elected to file a terminal disclaimer herewith in order to overcome the present rejection. Applicant respectfully requests the present rejection be withdrawn..

Claim Rejections – 35 USC § 103 (Kondo/Story)

The Official Action rejected claims 1- 2, 10, 24-25, and 31-46 under 35 USC 103(a) as being unpatentable over Kondo et al. (U.S. Patent No. 5,71,371) in view of Story et al. (U.S. Patent No. 5,905,912). Applicant respectfully requests the rejection of claims 1-2, 10, 24-25 and 31-46 be withdrawn.

Claims 1, 10, and 24

Each of claims 1, 10, and 24 require writing data from an I/O controller to a memory via a first bus, sending a tag from the I/O controller to a memory controller on a first bus after the memory write, requesting a completion status on a second bus, and then sending the completion status on the second bus after receiving a tag acknowledgement on the first bus. The present application teaches increasing the bandwidth to a DMA controller by providing two independent busses and dealing with coherency issues that arises as a result of two busses. Data coherency ensures that processor receives the latest data for an address, as there may be possibility of a processor or other device to operate on a stale data otherwise.

The Official Action appears to rely on description provided in col. 4, lines 18-51 and col. 4, line 56 through col. 5, line 12 of Kondo to teach writing data to the memory, sending the tag, requesting a completion status, then sending the completion status on the second bus after receiving a tag acknowledgement on the first bus. In contrast, Kondo appears to be teaching a bus control system to ensure that read data is provided to the correct requesting processor while dealing with a split read transaction, by enabling a destination system to place the identifier of the processor on an identifier transfer line after the requested data is available. For a system of reads, there may be no coherency issues, since the data is not being changed. Kondo appears to be silent on data writes to a memory under control of the DMA controller using two independent busses. Thus, Kondo appears to be void of teaching using two busses to respectively write data to the memory and send completion status to the processor after write is completed as required by claims 1, 10, and 24.

Further, the Official Action appears to rely on description provided in col. 2, lines 38-62 of Story for writing data to the memory and sending a tag via the first bus

and requesting a completion status and sending the completion status on the second bus after receiving a tag acknowledgement on the first bus. In contrast, Story appears to be teaching merely extending the capability of a DMA controller by providing the DMA controller with a list processor to support scatter-gather transfers. Story appears to be silent on writing data to a memory and sending completion status using two independent busses. Story appears to provide no teaching of using two busses to respectively write data to the memory and send completion status to the processor after write is completed as required by claims 1, 10, and 24. Thus, the combination of Kondo and Story appear to be devoid of teaching each and every limitation as required by claims 1, 10, and 24. Applicant respectfully requests the rejection of claims 1, 10, and 24 be withdrawn.

Claims 2 and 25

Each of claims 2 and 25 includes one of claims 1 and 24 as a base claim. Accordingly, each of claims 2 and 25 is allowable for at least the reasons stated above in regard to claims 1 and 24. Applicant respectfully requests that the rejection of claims 2 and 25 be withdrawn.

Claim 31

Claim 31 requires transferring data to a memory controller via a first bus, receiving a notification from the memory controller via the first bus after transferring the data to the memory controller, and providing the processor with the completion status via a second bus that is different than the first bus after receiving the notification from the memory controller. The Official Action appears to rely on description provided in col. 4, lines 18-51 and col. 4, line 56 through col. 5, line 12 of Kondo to teach transferring data to the memory, receiving a notification on the first bus, and providing the completion status to the processor on the second bus.

Applicant has reviewed Kondo in detail and is unable to locate where Kondo teaches transferring data to a memory controller via a first bus, receives a notification from the memory controller via the first bus, and sends a completion status using a second bus. In contrast, Kondo appears to be teaching a bus control system to ensure that read data is provided to the correct requesting processor while dealing with a split read transaction and Kondo appears to be silent on transferring data to the memory controller and providing completion status using two independent busses respectively. Kondo appears to be devoid of teaching transferring data and completion status respectively to the memory controller and the processor on the corresponding busses as required by claim 31.

Further, Story appears to be teaching merely extending the capability of a DMA controller by providing the DMA controller with a list processor to support scatter-gather transfers and is void of teaching using two independent busses respectively to transfer data to the memory controller and sending notification to the processor controller using two different busses. Thus, the combination of Kondo and Story appears lack at least one element of claim 31. Claims 32-36 depend from claim 31. Applicant respectfully requests the rejection of claims 31-36 be withdrawn.

Claim 37, 40, and 43

Claim 37, 40 and 43 require receiving via the first bus interface configuration information for a data write, write data to a memory via the second bus based upon the configuration information for the data write, to send a fence that requests a notification of receipt of the fence, and to generate a completion status for the data write based upon the notification. The Official Action appears to rely on description provided in col. 4, lines 18-51 and col. 4, line 56 through col. 5, line 12 of Kondo to teach receiving via the first bus interface configuration information for a data write,

write data to a memory via the second bus based upon the configuration information for the data write, to send a fence that requests a notification of receipt of the fence, and to generate a completion status for the data write based upon the notification. Applicant has reviewed Kondo in detail and is unable to locate where Kondo teaches using two buses, a first bus and a second bus, to receive configuration information on the first bus, to write data based on the configuration information on the second bus, to send a fence via second bus that requests notification, and generate a completion status for the data write based on the notification. Kondo appears to be teaching a bus control system to ensure that read data is provided to the correct requesting processor while dealing with a split read transaction. Kondo appears to be devoid of teaching using two buses to receive configuration information and then for writing data and sending fence as required by claims 37, 40, and 43.

Further, Story appears to be teaching merely extending the capability of a DMA controller by providing the DMA controller with a list processor to support scatter-gather transfers and is void of teaching using two independent busses respectively to receive configuration data and to write data, send fence as required by claims 37, 40, and 43. Thus, the combination of Kondo and Story appears to be devoid of at least one element of claims 37, 40, and 43. Claims 38-39, 41-42, 44-46 depend respectively from claims 37, 40, and 43. Applicant respectfully requests the rejection of claims 37-39, 40-42, and 43-46 be withdrawn.

Claim Rejections – 35 USC § 103 (Kondo/Story/Suzuki)

The Official Action rejected claims 5-6 and 11 under 35 USC 103(a) as being unpatentable over Kondo in view of Story and in further view of Suzuki (U.S. Patent No. 6,240,481). Applicant respectfully requests the rejection of claims 5-6 and 11 be withdrawn.

Claims 5-6

Each of claims 5-6 depend from claim 1. Accordingly, each of claims 5-6 are allowable for at least the reasons stated above in regard to claim 1. Applicant respectfully requests that the rejection of claims 5-6 be withdrawn.

Claim 11

Claim 11 depend from claim 10. Accordingly, claim 11 is allowable for at least the reasons stated above in regard to claim 10. Applicant respectfully requests the rejection of claim 11 be withdrawn.

Conclusion

The foregoing is submitted as a full and complete response to the Official Action. Applicant submits that the application is in condition for allowance. Reconsideration is requested, and allowance of the pending claims is earnestly solicited. Should it be determined that an additional fee is due under 37 CFR §§1.16 or 1.17, or any excess fee has been received, please charge that fee or credit the amount of overcharge to deposit account 02-2666. If the Examiner believes that there are any informalities, which can be corrected by an Examiner's amendment, a telephone call to the undersigned at (503) 439-8778 is respectfully solicited.

Respectfully submitted,

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